

# SEQUENCE LISTING

<110> CANFIELD, William

<120> SOLUBLE GLcNAc PHOSPHOTRANSFERASE

<130> 203515US77

<160> 38

<170> PatentIn version 3.1

<210> 1

<211> 3600

<212> DNA

<213> hybrid

<400> 1

```
atggagacag acacactcct gctatgggta ctgctgctct gggttccagg ttccactggt      60
gacgaagatc aggtagatcc gcggttaatc gacggtaagc ttagccgaga tcaataccat      120
gttttgtttg attcctatag agacaatatt gctggaaagt cttttcagaa tcggctttgt      180
ctgcccattgc cgattgacgt tgtttacacc tgggtgaatg gcacagatct tgaactactg      240
aaggaactac agcaggtcag agaacagatg gaggaggagc agaaagcaat gagagaaatc      300
cttgggaaaa acacaacgga acctactaag aagagtgaga agcagttaga gtgtttgcta      360
acacactgca ttaaggtgcc aatgcttgtc ctggaccagc cctgcccagc caacatcacc      420
ctgaaggacc tgccatctct ttatccttct tttcattctg ccagtgcacat tttcaatggt      480
gcaaaaccaa aaaacccttc taccaatgtc tcagttgttg tttttgacag tactaaggat      540
gttgaagatg ccactctcgg actgcttaaa ggaaatagca gacagacagt atggaggggc      600
tacttgacaa cagataaaga agtccttgga ttagtgctaa tgcaagattt ggctttcctg      660
agtggatttc caccaacatt caaggaaaca aatcaactaa aaacaaaatt gccagaaaat      720
ctttcctcta aagtcaaact gttgcagttg tattcagagg ccagtgtagc gcttctaaaa      780
ctgaataacc ccaaggattt tcaagaattg aataagcaaa ctaagaagaa catgaccatt      840
gatggaaaag aactgaccat aagtcctgca tatttattat gggatctgag cgccatcagc      900
cagtctaagc aggatgaaga catctctgcc agtcgttttg aagataacga agaactgagg      960
tactcattgc gatctatcga gaggcattgc ccatgggttc ggaatatttt cattgtcacc     1020
aacgggcaga ttccatcctg gctgaacctt gacaatcctc gagtgcacat agtaacacac     1080
caggatgttt ttcgaaattt gagccacttg cctaccttta gttcacctgc tattgaaagt     1140
cacgttcacg gcacgaagg gctgtcccag aagtttattt acctaaatga tgatgtcatg     1200
```

tttgggaagg	atgtctggcc	agatgatttt	tacagtcact	ccaaaggcca	gaaggtttat	1260
ttgacatggc	ctgtgccaaa	ctgtgccgag	ggctgccag	gttcctggat	taaggatggc	1320
tattgtgaca	aggcttgtaa	taattcagcc	tgcgattggg	atggtgggga	ttgctctgga	1380
aacagtggag	ggagtcgcta	tattgcagga	ggtggaggta	ctgggagtat	tggagttgga	1440
cagccctggc	agtttggtgg	aggaataaac	agtgtctctt	actgtaatca	gggatgtgcg	1500
aattcctggc	tcgctgataa	gttctgtgac	caagcatgca	atgtcttgtc	ctgtgggttt	1560
gatgctggcg	actgtgggca	agatcatttt	catgaattgt	ataaagtgat	ccttctccca	1620
aaccagactc	actatattat	tccaaaaggt	gaatgcctgc	cttatttcag	ctttgcagaa	1680
gtagccaaaa	gaggagttga	aggtgcctat	agtgacaatc	caataattcg	acatgcttct	1740
attgccaaca	agtggaaaac	catccacctc	ataatgcaca	gtggaatgaa	tgccaccaca	1800
atacatttta	atctcacggt	tcaaaataca	aacgatgaag	agttcaaaat	gcagataaca	1860
gtggaggtgg	acacaagggg	gggacccaaa	ctgaattcta	cggcccagaa	gggttacgaa	1920
aatttagtta	gtcccataac	acttcttcca	gaggcgga	tcctttttga	ggatattccc	1980
aaagaaaaac	gcttcccgaa	gtttaagaga	catgatgtta	actcaacaag	gagagcccag	2040
gaagaggtga	aaattccctt	ggtaaataat	tactctcttc	caaaagacgc	ccagttgagt	2100
ctcaatacct	tggatttgca	actggaacat	ggagacatca	cttgaaagg	atacaatttg	2160
tccaagtcag	ccttgctgag	atcatttctg	atgaactcac	agcatgctaa	aataaaaaat	2220
caagctataa	taacagatga	aacaaatgac	agtttggtgg	ctccacagga	aaaacagggt	2280
cataaaagca	tcttgccaaa	cagcttagga	gtgtctgaaa	gattgcagag	gttgactttt	2340
cctgcagtga	gtgtaaaagt	gaatggtcac	gaccagggtc	agaatccacc	cctggacttg	2400
gagaccacag	caagatttag	agtggaaact	cacacccaaa	aaaccatagg	cggaaatgtg	2460
acaaaagaaa	agccccatc	tctgattgtt	ccactggaaa	gccagatgac	aaaagaaaag	2520
aaaatcacag	ggaaagaaaa	agagaacagt	agaatggagg	aaaatgctga	aatcacata	2580
ggcgttactg	aagtgttact	tggaagaaag	ctgcagcatt	acacagatag	ttacttgggc	2640
tttttgccat	gggagaaaaa	aaagtatttc	ctagatcttc	tcgacgaaga	agagtcattg	2700
aagacacaat	tggcctactt	cactgatagc	aagaatagag	ccagatacaa	gagagataca	2760
tttgcagatt	ccctcagata	tgtaaataaa	attctaaata	gcaagtttgg	attcacatcg	2820
cggaaagtcc	ctgctcacat	gcctcacatg	attgaccgga	ttgttatgca	agaactgcaa	2880

gatatgttcc ctgaagaatt tgacaagacg tcatttcaca aagtgcgcca ttctgaggat 2940  
atgcagtttg ccttctctta tttttattat ctcatgagtg cagtgcagcc actgaatata 3000  
tctcaagtct ttgatgaagt tgatacagat caatctggtg tcttgtctga cagagaaatc 3060  
cgaacactgg ctaccagaat tcacgaactg cgtttaagtt tgcaggattt gacaggtctg 3120  
gaacacatgc taataaattg ctcaaaaatg cttcctgctg atatcacgca gctaaataat 3180  
attccaccaa ctccaggaatc ctactatgat cccaacctgc caccggtcac taaaagtcta 3240  
gtaacaaact gtaaaccagt aactgacaaa atccacaaag catataagga caaaaacaaa 3300  
tataggtttg aaatcatggg agaagaagaa atcgctttta aaatgattcg taccaacgtt 3360  
tctcatgtgg ttggccagtt ggatgacata agaaaaaacc ctaggaagtt tgtttgctg 3420  
aatgacaaca ttgaccacaa tcataaagat gctcagacag tgaaggctgt tctcaggac 3480  
ttctatgaat ccatgttccc cataccttcc caatttgaac tgccaagaga gtatcgaaac 3540  
cgtttccttc atatgcatga gctgcaggaa tggagggtt atcgagacaa attgaagtag 3600

<210> 2  
<211> 1199  
<212> PRT  
<213> hybrid

<400> 2

Met Glu Thr Asp Thr Leu Leu Leu Trp Val Leu Leu Leu Trp Val Pro  
1 5 10 15

Gly Ser Thr Gly Asp Glu Asp Gln Val Asp Pro Arg Leu Ile Asp Gly  
20 25 30

Lys Leu Ser Arg Asp Gln Tyr His Val Leu Phe Asp Ser Tyr Arg Asp  
35 40 45

Asn Ile Ala Gly Lys Ser Phe Gln Asn Arg Leu Cys Leu Pro Met Pro  
50 55 60

Ile Asp Val Val Tyr Thr Trp Val Asn Gly Thr Asp Leu Glu Leu Leu  
65 70 75 80

Lys Glu Leu Gln Gln Val Arg Glu Gln Met Glu Glu Glu Gln Lys Ala  
85 90 95

Met Arg Glu Ile Leu Gly Lys Asn Thr Thr Glu Pro Thr Lys Lys Ser

100	105	110
Glu Lys Gln Leu Glu Cys Leu Leu Thr His Cys Ile Lys Val Pro Met		
115	120	125
Leu Val Leu Asp Pro Ala Leu Pro Ala Asn Ile Thr Leu Lys Asp Leu		
130	135	140
Pro Ser Leu Tyr Pro Ser Phe His Ser Ala Ser Asp Ile Phe Asn Val		
145	150	155
Ala Lys Pro Lys Asn Pro Ser Thr Asn Val Ser Val Val Val Phe Asp		
	165	170
		175
Ser Thr Lys Asp Val Glu Asp Ala His Ser Gly Leu Leu Lys Gly Asn		
	180	185
		190
Ser Arg Gln Thr Val Trp Arg Gly Tyr Leu Thr Thr Asp Lys Glu Val		
	195	200
		205
Pro Gly Leu Val Leu Met Gln Asp Leu Ala Phe Leu Ser Gly Phe Pro		
	210	215
		220
Pro Thr Phe Lys Glu Thr Asn Gln Leu Lys Thr Lys Leu Pro Glu Asn		
	225	230
		235
		240
Leu Ser Ser Lys Val Lys Leu Leu Gln Leu Tyr Ser Glu Ala Ser Val		
	245	250
		255
Ala Leu Leu Lys Leu Asn Asn Pro Lys Asp Phe Gln Glu Leu Asn Lys		
	260	265
		270
Gln Thr Lys Lys Asn Met Thr Ile Asp Gly Lys Glu Leu Thr Ile Ser		
	275	280
		285
Pro Ala Tyr Leu Leu Trp Asp Leu Ser Ala Ile Ser Gln Ser Lys Gln		
	290	295
		300
Asp Glu Asp Ile Ser Ala Ser Arg Phe Glu Asp Asn Glu Glu Leu Arg		
	305	310
		315
		320
Tyr Ser Leu Arg Ser Ile Glu Arg His Ala Pro Trp Val Arg Asn Ile		
	325	330
		335





Val Lys Val Asn Gly His Asp Gln Gly Gln Asn Pro Pro Leu Asp Leu  
785 790 795 800

Glu Thr Thr Ala Arg Phe Arg Val Glu Thr His Thr Gln Lys Thr Ile  
805 810 815

Gly Gly Asn Val Thr Lys Glu Lys Pro Pro Ser Leu Ile Val Pro Leu  
820 825 830

Glu Ser Gln Met Thr Lys Glu Lys Lys Ile Thr Gly Lys Glu Lys Glu  
835 840 845

Asn Ser Arg Met Glu Glu Asn Ala Glu Asn His Ile Gly Val Thr Glu  
850 855 860

Val Leu Leu Gly Arg Lys Leu Gln His Tyr Thr Asp Ser Tyr Leu Gly  
865 870 875 880

Phe Leu Pro Trp Glu Lys Lys Lys Tyr Phe Leu Asp Leu Leu Asp Glu  
885 890 895

Glu Glu Ser Leu Lys Thr Gln Leu Ala Tyr Phe Thr Asp Ser Lys Asn  
900 905 910

Arg Ala Arg Tyr Lys Arg Asp Thr Phe Ala Asp Ser Leu Arg Tyr Val  
915 920 925

Asn Lys Ile Leu Asn Ser Lys Phe Gly Phe Thr Ser Arg Lys Val Pro  
930 935 940

Ala His Met Pro His Met Ile Asp Arg Ile Val Met Gln Glu Leu Gln  
945 950 955 960

Asp Met Phe Pro Glu Glu Phe Asp Lys Thr Ser Phe His Lys Val Arg  
965 970 975

His Ser Glu Asp Met Gln Phe Ala Phe Ser Tyr Phe Tyr Tyr Leu Met  
980 985 990

Ser Ala Val Gln Pro Leu Asn Ile Ser Gln Val Phe Asp Glu Val Asp  
995 1000 1005

Thr Asp Gln Ser Gly Val Leu Ser Asp Arg Glu Ile Arg Thr Leu

[illegible]

```
<210> 3
<211> 5597
<212> DNA
<213> Homo sapiens
```

<400> 3



cggagccgag cgggcgtccg tcgccggagc tgcaatgagc ggcgcccgga ggctgtgacc 60  
 tgcgcgcggc ggcccgaccg gggcccctga atggcggctc gctgaggcgg cggcggcggc 120  
 ggcggctcag gctcctcggg gcgtggcgtg gcggtgaagg ggtgatgctg ttcaagctcc 180  
 tgcagagaca aacctatacc tgccctgtccc acaggatatgg gctctacgtg tgcttcttgg 240  
 gcgtcgttgt caccatcgtc tccgccttcc agttcggaga ggtggttctg gaatggagcc 300  
 gagatcaata ccatgttttg tttgattcct atagagacaa tattgctgga aagtcctttc 360  
 agaatcggct ttgtctgccc atgccgattg acgttgttta cacctgggtg aatggcacag 420  
 atcttgaact actgaaggaa ctacagcagg tcagagaaca gatggaggag gagcagaaag 480  
 caatgagaga aatccttggg aaaaacacaa cggaacctac taagaagagt gagaagcagt 540  
 tagagtgttt gctaacacac tgcattaagg tgccaatgct tgtactggac ccagccctgc 600  
 cagccaacat caccctgaag gacgtgccat ctctttatcc ttcttttcat tctgccagt 660  
 acattttcaa tgttgcaaaa ccaaaaaacc cttctaccaa tgtctcagtt gttgtttttg 720  
 acagtactaa ggatgttgaa gatgccact ctggactgct taaaggaaat agcagacaga 780  
 cagtatggag ggggtacttg acaacagata aagaagtccc tggattagt ctaatgcaag 840  
 atttggttt cctgagtgga tttccaccaa cattcaagga acaaatcaa ctaaaaacaa 900  
 aattgccaga aaatctttcc tctaaagtca aactgttgca gttgtattca gaggccagt 960  
 tagcgttct aaaactgaat aaccccaagg attttcaaga attgaataag caaactaaga 1020  
 agaacatgac cattgatgga aaagaactga ccataagtcc tgcataattta ttatgggatc 1080  
 tgagcgccat cagccagtct aagcaggatg aagacatctc tgccagtcgt tttgaagata 1140  
 acgaagaact gaggtactca ttgcgatcta tcgagaggca tgcaccatgg gttcgaata 1200  
 ttttcattgt caccaacggg cagattccat cctggctgaa ccttgacaat cctcgagtga 1260  
 caatagtaac acaccaggat gtttttcgaa atttgagcca cttgcctacc tttagtccac 1320  
 ctgctattga aagtcacatt catcgcatcg aagggtgtc ccagaagttt atttacctaa 1380  
 atgatgatgt catgtttggg aaggatgtct ggccagatga tttttacagt cactccaaag 1440  
 gccagaaggt ttatttgaca tggcctgtgc caaactgtgc cgaggggtgc ccaggttcct 1500  
 ggattaagga tggtattgt gacaaggctt gtaataattc agcctgcgat tgggatggtg 1560  
 gggattgtc tggaaacagt ggaggagtc gctatattgc aggaggtgga ggtactggga 1620  
 gtattggagt tggacacccc tggcagtttg gtggaggaat aaacagtgtc tcttactgta 1680  
 atcagggatg tgcgaattcc tggctcgtg ataagttctg tgaccaagca tgcaatgtct 1740

tgtcctgtgg	gtttgatgct	ggcgactgtg	ggcaagatca	ttttcatgaa	ttgtataaag	1800
tgatccttct	cccaaaccag	actcactata	ttattccaaa	aggtgaatgc	ctgccttatt	1860
tcagctttgc	agaagtagcc	aaaagaggag	ttgaagggtgc	ctatagtgc	aatccaataa	1920
ttcgacatgc	ttctattgcc	aacaagtgga	aaaccatcca	cctcataatg	cacagtggaa	1980
tgaatgccac	cacaatacat	tttaatctca	cgtttcaaaa	tacaaacgat	gaagagttca	2040
aaatgcagat	aacagtggag	gtggacacaa	gggagggacc	aaaactgaat	tctacggccc	2100
agaagggtta	cgaaaattta	gttagtccca	taacacttct	tccagaggcg	gaaatccttt	2160
ttgaggatat	tcccaaagaa	aaacgcttcc	cgaagttaa	gagacatgat	gttaactcaa	2220
caaggagagc	ccaggaagag	gtgaaaattc	ccctggtaa	tatttcactc	cttccaaaag	2280
acgcccagtt	gagtctcaat	accttggatt	tgcaactgga	acatggagac	atcactttga	2340
aaggatacaa	tttgtccaag	tcagccttgc	tgagatcatt	tctgatgaac	tcacagcatg	2400
ctaaaataaa	aatcaagct	ataataacag	atgaaacaaa	tgacagtttg	gtggctccac	2460
aggaaaaaca	ggttcataaa	agcatcttgc	caaacagctt	aggagtgtct	gaaagattgc	2520
agaggttgac	ttttcctgca	gtgagtgtaa	aagtgaatgg	tcatgaccag	ggtcagaatc	2580
cacccctgga	cttgagagacc	acagcaagat	ttagagtgga	aactcacacc	caaaaaacca	2640
taggcggaaa	tgtgacaaaa	gaaaagcccc	catctctgat	tgttccactg	gaaagccaga	2700
tgacaaaaga	aaagaaaatc	acagggaaag	aaaaagagaa	cagtagaatg	gaggaaaatg	2760
ctgaaaatca	cataggcggt	actgaagtgt	tacttgggaag	aaagctgcag	cattacacag	2820
atagttactt	gggctttttg	ccatgggaga	aaaaaaagta	ttccaagat	cttctcgacg	2880
aagaagagtc	attgaagaca	caattggcat	acttcaactga	tagcaaaaat	actgggaggc	2940
aactaaaaga	tacatttgca	gattccctca	gatatgtaaa	taaaattcta	aatagcaagt	3000
ttggattcac	atcgcggaaa	gtccctgctc	acatgcctca	catgattgac	cggattgtta	3060
tgcaagaact	gcaagatatg	ttccctgaag	aatttgacaa	gacgtcattt	cacaaagtgc	3120
gccattctga	ggatatgcag	tttgcccttct	cttattttta	ttatctcatg	agtgcagtgc	3180
agccactgaa	tatatctcaa	gtctttgatg	aagttgatac	agatcaatct	ggtgtcttgt	3240
ctgacagaga	aatccgaaca	ctggctacca	gaattcacga	actgccgtta	agtttgcagg	3300
atttgacagg	tctggaacac	atgctaataa	attgctcaaa	aatgcttcct	gctgatatca	3360
cgcagctaaa	taatattcca	ccaactcagg	aatcctacta	tgatcccaac	ctgccaccgg	3420



[illegible]

<400> 4

Lys Asn Thr Thr Glu Pro Thr Lys Lys Ser Glu Lys Gln Leu Glu Cys  
115 120 125

10023888-12404  
Total 888200

Leu Leu Thr His Cys Ile Lys Val Pro Met Leu Val Leu Asp Pro Ala  
130 135 140

Leu Pro Ala Asn Ile Thr Leu Lys Asp Val Pro Ser Leu Tyr Pro Ser  
145 150 155 160

Phe His Ser Ala Ser Asp Ile Phe Asn Val Ala Lys Pro Lys Asn Pro  
165 170 175

Ser Thr Asn Val Ser Val Val Val Phe Asp Ser Thr Lys Asp Val Glu  
180 185 190

Asp Ala His Ser Gly Leu Leu Lys Gly Asn Ser Arg Gln Thr Val Trp  
195 200 205

Arg Gly Tyr Leu Thr Thr Asp Lys Glu Val Pro Gly Leu Val Leu Met  
210 215 220

Gln Asp Leu Ala Phe Leu Ser Gly Phe Pro Pro Thr Phe Lys Glu Thr  
225 230 235 240

Asn Gln Leu Lys Thr Lys Leu Pro Glu Asn Leu Ser Ser Lys Val Lys  
245 250 255

Leu Leu Gln Leu Tyr Ser Glu Ala Ser Val Ala Leu Leu Lys Leu Asn  
260 265 270

Asn Pro Lys Asp Phe Gln Glu Leu Asn Lys Gln Thr Lys Lys Asn Met  
275 280 285

Thr Ile Asp Gly Lys Glu Leu Thr Ile Ser Pro Ala Tyr Leu Leu Trp  
290 295 300

Asp Leu Ser Ala Ile Ser Gln Ser Lys Gln Asp Glu Asp Ile Ser Ala  
305 310 315 320

Ser Arg Phe Glu Asp Asn Glu Glu Leu Arg Tyr Ser Leu Arg Ser Ile  
325 330 335

Glu Arg His Ala Pro Trp Val Arg Asn Ile Phe Ile Val Thr Asn Gly  
340 345 350

Gln Ile Pro Ser Trp Leu Asn Leu Asp Asn Pro Arg Val Thr Ile Val

Protein Data Bank

355

360

365

Thr His Gln Asp Val Phe Arg Asn Leu Ser His Leu Pro Thr Phe Ser  
370 375 380

Ser Pro Ala Ile Glu Ser His Ile His Arg Ile Glu Gly Leu Ser Gln  
385 390 395 400

Lys Phe Ile Tyr Leu Asn Asp Asp Val Met Phe Gly Lys Asp Val Trp  
405 410 415

Pro Asp Asp Phe Tyr Ser His Ser Lys Gly Gln Lys Val Tyr Leu Thr  
420 425 430

Trp Pro Val Pro Asn Cys Ala Glu Gly Cys Pro Gly Ser Trp Ile Lys  
435 440 445

Asp Gly Tyr Cys Asp Lys Ala Cys Asn Asn Ser Ala Cys Asp Trp Asp  
450 455 460

Gly Gly Asp Cys Ser Gly Asn Ser Gly Gly Ser Arg Tyr Ile Ala Gly  
465 470 475 480

Gly Gly Gly Thr Gly Ser Ile Gly Val Gly His Pro Trp Gln Phe Gly  
485 490 495

Gly Gly Ile Asn Ser Val Ser Tyr Cys Asn Gln Gly Cys Ala Asn Ser  
500 505 510

Trp Leu Ala Asp Lys Phe Cys Asp Gln Ala Cys Asn Val Leu Ser Cys  
515 520 525

Gly Phe Asp Ala Gly Asp Cys Gly Gln Asp His Phe His Glu Leu Tyr  
530 535 540

Lys Val Ile Leu Leu Pro Asn Gln Thr His Tyr Ile Ile Pro Lys Gly  
545 550 555 560

Glu Cys Leu Pro Tyr Phe Ser Phe Ala Glu Val Ala Lys Arg Gly Val  
565 570 575

Glu Gly Ala Tyr Ser Asp Asn Pro Ile Ile Arg His Ala Ser Ile Ala  
580 585 590







85

90

95

Leu Ser Asp Arg Glu Ile Arg Thr Leu Ala Thr Arg Ile His Glu Leu  
 100 105 110

Pro Leu Ser Leu Gln Asp Leu Thr Gly Leu Glu His Met Leu Ile Asn  
 115 120 125

Cys Ser Lys Met Leu Pro Ala Asp Ile Thr Gln Leu Asn Asn Ile Pro  
 130 135 140

Pro Thr Gln Glu Ser Tyr Tyr Asp Pro Asn Leu Pro Pro Val Thr Lys  
 145 150 155 160

Ser Leu Val Thr Asn Cys Lys Pro Val Thr Asp Lys Ile His Lys Ala  
 165 170 175

Tyr Lys Asp Lys Asn Lys Tyr Arg Phe Glu Ile Met Gly Glu Glu Glu  
 180 185 190

Ile Ala Phe Lys Met Ile Arg Thr Asn Val Ser His Val Val Gly Gln  
 195 200 205

Leu Asp Asp Ile Arg Lys Asn Pro Arg Lys Phe Val Cys Leu Asn Asp  
 210 215 220

Asn Ile Asp His Asn His Lys Asp Ala Gln Thr Val Lys Ala Val Leu  
 225 230 235 240

Arg Asp Phe Tyr Glu Ser Met Phe Pro Ile Pro Ser Gln Phe Glu Leu  
 245 250 255

Pro Arg Glu Tyr Arg Asn Arg Phe Leu His Met His Glu Leu Gln Glu  
 260 265 270

Trp Arg Ala Tyr Arg Asp Lys Leu Lys Phe Trp Thr His Cys Val Leu  
 275 280 285

Ala Thr Leu Ile Met Phe Thr Ile Phe Ser Phe Phe Ala Glu Gln Leu  
 290 295 300

Ile Ala Leu Lys Arg Lys Ile Phe Pro Arg Arg Arg Ile His Lys Glu  
 305 310 315 320

Ala Ser Pro Asn Arg Ile Arg Val  
325

<210> 6  
<211> 1219  
<212> DNA  
<213> Homo sapiens

<400> 6  
gtagagcgca ggtgcgcggc tcgatggcgg cggggctggc gcggctcctg ttgctcctcg 60  
ggctctcggc cggcggggccc gcgccggcag gtgcagcgaa gatgaagggtg gtggaggagc 120  
ccaacgcgtt tgggggtgaac aaccgcgttct tgccctcaggc cagtcgcctc caggccaaga 180  
gggatccttc acccgtgtct ggaccgcgtc atctcttccg actctcgggc aagtgttca 240  
gcctggtgga gtccacgtac aagtatgagt tctgcccgtt ccacaacgtg acccagcacg 300  
agcagacott cgcgtggaac gcctacagtg ggatcctcgg catctggcac gagtgggaga 360  
tcgccaacaa caccttcacg ggcatgtgga tgagggacgg tgacgcctgc cgttcccggg 420  
gccggcagag caaggtggag ctggcgtgtg gaaaaagcaa ccggctggcc catgtgtccg 480  
agccgagcac ctgcgtctat gcgctgacgt tcgagacccc cctcgtctgc ccccccaag 540  
ccttgctagt gtaccaacc ctgccagagg ccctgcagcg gcagtgggac caggtagagc 600  
aggacctggc cgatgagctg atcaccccc agggccatga gaagttgctg aggacacttt 660  
ttgaggatgc tggctactta aagaccccag aagaaaatga acccaccag ctggagggag 720  
gtcctgacag cttgggggtt gagaccctgg aaaactgcag gaaggctcat aaagaactct 780  
caaaggagat caaaaggctg aaaggtttgc tcaccagca cggcatcccc tacacgaggc 840  
ccacagaaac ttccaacttg gagcacttgg gccacgagac gccagagcc aagtctccag 900  
agcagctgcg gggtagccca ggactgcgtg ggagtttgtg accttggtgt gggagagcag 960  
aggtggacgc ggccgagagc cctacagaga agctggctgg taggaccgcg aggaccagct 1020  
gaccaggctt gtgctcagag aagcagacaa aacaaagatt caaggtttta attaatccc 1080  
atactgataa aaataactcc atgaattctg taaaccattg cataaatgct atagtgtaaa 1140  
aaaattttaa caagtgttaa ctttaaacag ttcgctacaa gtaaatgatt ataaatacta 1200  
aaaaaaaaa aaaaaaaaaa 1219

<210> 7  
<211> 305

<212> PRT  
 <213> Homo sapiens

<400> 7

Met Ala Ala Gly Leu Ala Arg Leu Leu Leu Leu Gly Leu Ser Ala  
 1 5 10 15

Gly Gly Pro Ala Pro Ala Gly Ala Ala Lys Met Lys Val Val Glu Glu  
 20 25 30

Pro Asn Ala Phe Gly Val Asn Asn Pro Phe Leu Pro Gln Ala Ser Arg  
 35 40 45

Leu Gln Ala Lys Arg Asp Pro Ser Pro Val Ser Gly Pro Val His Leu  
 50 55 60

Phe Arg Leu Ser Gly Lys Cys Phe Ser Leu Val Glu Ser Thr Tyr Lys  
 65 70 75 80

Tyr Glu Phe Cys Pro Phe His Asn Val Thr Gln His Glu Gln Thr Phe  
 85 90 95

Arg Trp Asn Ala Tyr Ser Gly Ile Leu Gly Ile Trp His Glu Trp Glu  
 100 105 110

Ile Ala Asn Asn Thr Phe Thr Gly Met Trp Met Arg Asp Gly Asp Ala  
 115 120 125

Cys Arg Ser Arg Ser Arg Gln Ser Lys Val Glu Leu Ala Cys Gly Lys  
 130 135 140

Ser Asn Arg Leu Ala His Val Ser Glu Pro Ser Thr Cys Val Tyr Ala  
 145 150 155 160

Leu Thr Phe Glu Thr Pro Leu Val Cys His Pro His Ala Leu Leu Val  
 165 170 175

Tyr Pro Thr Leu Pro Glu Ala Leu Gln Arg Gln Trp Asp Gln Val Glu  
 180 185 190

Gln Asp Leu Ala Asp Glu Leu Ile Thr Pro Gln Gly His Glu Lys Leu  
 195 200 205







```

tttaaaaaac aataagtggc tactaagtta gtcattctca cttctcaaaa taacaaatca 4200
ggatgtcaaa acatttgtat agatcttatt taaataatat agaacgatta cttcttttagc 4260
ctatctaaat tattgatattt tattaacagt caagtggctt tgaaccgcta acaactactg 4320
aagagctcga gattgacgtt gaaagtgtt tgagcttggt taactcattc cccaagaata 4380
ctgtgacctc gtgtgcgggc ctgattgcga agggctagt tcaagtagca gtgctgctca 4440
ccggatgtaa ttatgtcgtg gaaatgtaca tacagacaaa agtgcctcac ttcagaaatg 4500
agtagtgctg atggcaccag cgagtgatgg tgtccatttg gaaacccatg ataccttcca 4560
atgcccaccc tgcttacttt atacagagca ggggttaacc aacttctgtc aaagaacagt 4620
aaagaacttg agatacatcc atctttgtca aatagttttc cttgctaaca tttattattg 4680
ttggtgtttt gggaggttta ttttatttta ttgctttgtt atttttcaag acgggggattc 4740
tctgtgtagc tctggctggt tggtaattca ctctaaagac caggctggcc ttgaacttag 4800
agattcacct gcttctgctt cctgaatggt aggacatgtg cccacattgc ctaccacccc 4860
cccttttggg ggggggtgagc aactcaataa aaagatgaaa acctgcttta gtttgcagct 4920
atacaaaagc agcaggcctc agccagactt gacccccggg gccattgttg gccacgggga 4980
gaatcatttt tgacgtgggt aagcaaacc tgatattggt catgctgtgt tatgtcatta 5040
tgtggtggtt ttgaattttg gaagatattt tcagtcatga tttcagtagt attcctccaa 5100
aatggcacac atttttgtaa taagaacttg aaatgtaaat attgtgtttg tgctgtaaat 5160
tttgtgtatt tcaaaaactg aagtttcata aaaaaacaca cttattggaa aaaaaaaaaa 5220
aaaaaaaaa 5229

```

<210> 9  
 <211> 908  
 <212> PRT  
 <213> Mus musculus

<400> 9

Met Leu Phe Lys Leu Leu Gln Arg Gln Thr Tyr Thr Cys Leu Ser His  
 1 5 10 15

Arg Tyr Gly Leu Tyr Val Cys Phe Val Gly Val Val Val Thr Ile Val  
 20 25 30

Ser Ala Phe Gln Phe Gly Glu Val Val Leu Glu Trp Ser Arg Asp Gln  
 35 40 45

Tyr His Val Leu Phe Asp Ser Tyr Arg Asp Asn Ile Ala Gly Lys Ser  
50 55 60

Phe Gln Asn Arg Leu Cys Leu Pro Met Pro Ile Asp Val Val Tyr Thr  
65 70 75 80

Trp Val Asn Gly Thr Asp Leu Glu Leu Leu Lys Glu Leu Gln Gln Val  
85 90 95

Arg Glu His Met Glu Glu Glu Gln Arg Ala Met Arg Glu Thr Leu Gly  
100 105 110

Lys Asn Thr Thr Glu Pro Thr Lys Lys Ser Glu Lys Gln Leu Glu Cys  
115 120 125

Leu Leu Thr His Cys Ile Lys Val Pro Met Leu Val Leu Asp Pro Ala  
130 135 140

Leu Pro Ala Thr Ile Thr Leu Lys Asp Leu Pro Thr Leu Tyr Pro Ser  
145 150 155 160

Phe His Ala Ser Ser Asp Met Phe Asn Val Ala Lys Pro Lys Asn Pro  
165 170 175

Ser Thr Asn Val Pro Val Val Val Phe Asp Thr Thr Lys Asp Val Glu  
180 185 190

Asp Ala His Ala Gly Pro Phe Lys Gly Gly Gln Gln Thr Asp Val Trp  
195 200 205

Arg Ala Tyr Leu Thr Thr Asp Lys Asp Ala Pro Gly Leu Val Leu Ile  
210 215 220

Gln Gly Leu Ala Phe Leu Ser Gly Phe Pro Pro Thr Phe Lys Glu Thr  
225 230 235 240

Ser Gln Leu Lys Thr Lys Leu Pro Arg Lys Ala Phe Pro Leu Lys Ile  
245 250 255

Lys Leu Leu Arg Leu Tyr Ser Glu Ala Ser Val Ala Leu Leu Lys Leu  
260 265 270







10023933-122101

725

730

735

Leu Arg Ser Phe Leu Gly Asn Ser Leu Asp Thr Lys Ile Lys Pro Gln  
740 745 750

Ala Arg Thr Asp Glu Thr Lys Gly Asn Leu Glu Val Pro Gln Glu Asn  
755 760 765

Pro Ser His Arg Arg Pro His Gly Phe Ala Gly Glu His Arg Ser Glu  
770 775 780

Arg Trp Thr Ala Pro Ala Glu Thr Val Thr Val Lys Gly Arg Asp His  
785 790 795 800

Ala Leu Asn Pro Pro Pro Val Leu Glu Thr Asn Ala Arg Leu Ala Gln  
805 810 815

Pro Thr Leu Gly Val Thr Val Ser Lys Glu Asn Leu Ser Pro Leu Ile  
820 825 830

Val Pro Pro Glu Ser His Leu Pro Lys Glu Glu Glu Ser Asp Arg Ala  
835 840 845

Glu Gly Asn Ala Val Pro Val Lys Glu Leu Val Pro Gly Arg Arg Leu  
850 855 860

Gln Gln Asn Tyr Pro Gly Phe Leu Pro Trp Glu Lys Lys Lys Tyr Phe  
865 870 875 880

Gln Asp Leu Leu Asp Glu Glu Glu Ser Leu Lys Thr Gln Leu Ala Tyr  
885 890 895

Phe Thr Asp Arg Lys His Thr Gly Arg Gln Leu Lys  
900 905

<210> 10  
<211> 328  
<212> PRT  
<213> Mus musculus

<400> 10

Asp Thr Phe Ala Asp Ser Leu Arg Tyr Val Asn Lys Ile Leu Asn Ser  
1 5 10 15





```

ttaatttttg agactgggtc tcattatgtg gccctagaca gatactgaga gcctcctcca 720
caggaacaag catgggaatc ctgccacaga caaccagttc tgtggtcttg agatgagttt 780
gtcagtcctt aggagttagg tcagcctgcc tctgcattcc caataattta ggaaaggagc 840
ttggggcggt ctggccttga tggttagtgc cctcctgcc aacctagctt ccagctttag 900
gggtagcaga gtttataacc atgctaaact gctgttgtgt tcttcccag ggcccctgca 960
tctcttcaga cttgctggca agtgctttag cctagtggag tccacgtgag tgccaggctg 1020
gtgggtggag tgggcggagt ctgcagagct cctgatgtgc ctgtgtttcc cagggtacaag 1080
tatgaattct gccctttcca caacgtcacc cagcacgagc agaccttccg ctggaatgcc 1140
tacagcggga tccttggcat ctggcatgag tgggaaatca tcaacaatac cttcaagggc 1200
atgtggatga ctgatgggga ctctgccac tcccgagacc ggagagcaa ggtggagctc 1260
acctgtggaa agatcaaccg actggccac gtgtctgagc caagcacctg tgtctatgca 1320
ttgacattcg agacctctt tgtttgcat cccactctt tgtagtgta tccaactctg 1380
tcagaagccc tgcagcagcc cttggaccag gtggaacagg acctggcaga tgaactgatc 1440
acaccacagg gctatgagaa gttgctaagg gtactttttg aggatgctgg ctacttaaag 1500
gtcccaggag aaacccatcc caccagctg gcaggaggtt ccaagggcct ggggcttgag 1560
actctggaca actgtagaaa ggcacatgca gagctgtcac aggaggtaca aagactgacg 1620
agtctgctgc aacagcatgg aatccccac actcagccca caggtcagtc tgctgcctt 1680
ggtcagctgc cagccactcc ggggcctgca gcactggggc agatctttat tgctacccat 1740
tctggcagaa accactcact ctcagcacct gggtcagcag ctccccatag gtgcaatcgc 1800
agcagagcat ctgcggagtg acccaggact acgtgggaac atcctgtgag caaggtggcc 1860
acgaagaata gaaatatcct gagctttgag tgtcctttca cagagtgaac aaaactggtg 1920
tgggtgtagac acggcttctt ttggcatatt ctagatcaga cagtgtcact gacaaacaag 1980
agggacctgc tggccagcct ttgttgtgcc caaagatcca gacaaaataa agattcaaag 2040
ttttaattaa aaaaaaaaaa aaaggaattc 2070

```

```

<210> 12
<211> 307
<212> PRT
<213> Mus musculus

<400> 12

```

[illegible][illegible][illegible][illegible][illegible]

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50
51	52	53	54	55
56	57	58	59	60
61	62	63	64	65
66	67	68	69	70
71	72	73	74	75
76	77	78	79	80
81	82	83	84	85
86	87	88	89	90
91	92	93	94	95
96	97	98	99	100

[illegible]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	

[illegible][illegible][illegible][illegible][illegible]

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50
51	52	53	54	55
56	57	58	59	60
61	62	63	64	65
66	67	68	69	70
71	72	73	74	75
76	77	78	79	80
81	82	83	84	85
86	87	88	89	90
91	92	93	94	95
96	97	98	99	100

[illegible]

# 703019

Gln Arg Leu Thr Ser Leu Leu Gln Gln His Gly Ile Pro His Thr Gln  
260 265 270

Pro Thr Glu Thr Thr His Ser Gln His Leu Gly Gln Gln Leu Pro Ile  
275 280 285

Gly Ala Ile Ala Ala Glu His Leu Arg Ser Asp Pro Gly Leu Arg Gly  
290 295 300

Asn Ile Leu  
305

```
<210> 13
<211> 460
<212> DNA
<213> Rattus rattus
```

[illegible]

```
<210> 14
<211> 113
<212> PRT
<213> Rattus rattus
```

<400> 14

Phe Pro Pro Thr Phe Lys Glu Thr Ser Gln Leu Lys Thr Lys Leu Pro  
1 5 10 15



Glu Asn Leu Ser Ser Lys Ile Lys Leu Leu Gln Leu Tyr Ser Glu Ala  
 20 25 30

Ser Val Ala Leu Leu Lys Leu Asn Asn Pro Lys Gly Phe Pro Glu Leu  
 35 40 45

Asn Lys Gln Thr Lys Lys Asn Met Ser Ile Ser Gly Lys Glu Leu Ala  
 50 55 60

Ile Ser Pro Ala Tyr Leu Leu Trp Asp Leu Ser Ala Ile Ser Gln Ser  
 65 70 75 80

Lys Gln Asp Glu Asp Val Ser Ala Ser Arg Phe Glu Asp Asn Glu Glu  
 85 90 95

Leu Arg Tyr Ser Leu Arg Ser Ile Glu Arg His Asp Ser Met Ser Pro  
 100 105 110

Leu

<210> 15  
 <211> 1105  
 <212> DNA  
 <213> Drosophila melanogaster

<220>  
 <221> misc\_feature  
 <222> (903)..(903)  
 <223> n is a, g, t, or c

<220>  
 <221> misc\_feature  
 <222> (935)..(935)  
 <223> n is a, g, t, or c

<220>  
 <221> misc\_feature  
 <222> (1023)..(1023)  
 <223> n is a, g, t, or c

<220>  
 <221> misc\_feature  
 <222> (1035)..(1035)  
 <223> n is a, g, t, or c



<400> 16

Gly Thr Arg Arg Phe Asp Asp Lys Asn Glu Leu Arg Tyr Ser Leu Arg  
1 5 10 15

Ser Leu Glu Lys His Ala Ala Trp Ile Arg His Val Tyr Ile Val Thr  
20 25 30

Asn Gly Gln Ile Pro Ser Trp Leu Asp Leu Ser Tyr Glu Arg Val Thr  
35 40 45

Val Val Pro His Glu Val Leu Ala Pro Asp Pro Asp Gln Leu Pro Thr  
50 55 60

Phe Ser Ser Ser Ala Ile Glu Thr Phe Leu His Arg Ile Pro Lys Leu  
65 70 75 80

Ser Lys Arg Phe Leu Tyr Leu Asn Asp Asp Ile Phe Leu Gly Ala Pro  
85 90 95

Leu Tyr Pro Glu Asp Leu Tyr Thr Glu Ala Glu Gly Val Arg Val Tyr  
100 105 110

Gln Ala Trp Met Val Pro Gly Cys Ala Leu Asp Cys Pro Trp Thr Tyr  
115 120 125

Ile Gly Asp Gly Ala Cys Asp Arg His Cys Asn Ile Asp Ala Cys Gln  
130 135 140

Phe Asp Gly Gly Asp Cys Ser Glu Thr Gly Pro Ala Ser Asp Ala His  
145 150 155 160

Val Ile Pro Pro Ser Lys Glu Val Leu Glu Val Gln Pro Ala Ala Val  
165 170 175

Pro Gln Ser Arg Val His Arg Phe Pro Gln Met Gly Leu Gln Lys Leu  
180 185 190

Phe Arg Arg Ser Ser Ala Asn Phe Lys Asp Val Met Arg His Arg Asn  
195 200 205

Val Ser Thr Leu Lys Glu Leu Arg Arg Ile Val Glu Arg Phe Asn Lys  
210 215 220

Ala Lys Leu Met Ser Leu Asn Pro Glu Leu Glu Thr Ser Ser Ser Glu  
 225 230 235 240

Pro Gln Thr Thr Gln Arg His Gly Leu Arg Lys Glu Asp Phe Lys Ser  
 245 250 255

Ser Thr Asp Ile Tyr Ser His Ser Leu Ile Ala Thr Asn Met Leu Leu  
 260 265 270

Asn Arg Ala Tyr Gly Phe Lys Ala Arg His Val Leu Ala His Val Gly  
 275 280 285

Phe Leu Ile Asp Lys Asp Ile Val Glu Ala Met Gln Arg Arg Phe His  
 290 295 300

Gln Gln Ile Leu Asp Thr Ala His Gln Arg Phe Arg Ala Pro Thr Asp  
 305 310 315 320

Leu Gln Tyr Ala Phe Ala Tyr Tyr Ser Phe Leu Met Ser Glu Thr Lys  
 325 330 335

Val Met Ser Val Glu Glu Ile Phe Asp Glu Phe Asp Thr Asp Gly Ser  
 340 345 350

Ala Thr Trp Ser Asp Arg Glu Val Arg Thr Phe Leu Thr Arg Ile Tyr  
 355 360 365

Gln Pro Pro Leu Asp Trp Ser Ala Met Arg Tyr Phe Glu Glu Val Val  
 370 375 380

Gln Asn Cys Thr Arg Asn Leu Gly Met His Leu Lys Val Asp Thr Val  
 385 390 395 400

Glu His Ser Thr Leu Val Tyr Glu Arg Tyr Glu Asp Ser Asn Leu Pro  
 405 410 415

Thr Ile Thr Arg Asp Leu Val Val Arg Cys Pro Leu Leu Ala Glu Ala  
 420 425 430

Leu Ala Ala Asn Phe Ala Val Arg Pro Lys Tyr Asn Phe His Val Ser  
 435 440 445

Pro Lys Arg Thr Ser His Ser Asn Phe Met Met Leu Thr Ser Asn Leu  
450 455 460

Thr Glu Val Val Glu Ser Leu Asp Arg Leu Arg Arg Asn Pro Arg Lys  
465 470 475 480

Phe Asn Cys Ile Asn Asp Asn Leu Asp Ala Asn Arg Gly Glu Asp Asn  
485 490 495

Glu Asp Gly Ala Pro Ser  
500

<210> 17  
<211> 2183  
<212> DNA  
<213> Homo sapiens

<400> 17  
atggcgacct ccacgggtcg ctggcttctc ctccggcttg cactattcgg cttcctctgg 60  
gaagcgtccg gcggcctcga ctcgggggcc tcccgcgacg acgacttgct actgccctat 120  
ccacgcgcgc ggcgcgcgct cccccgggac tgcacacggg tgcgcgccgg caaccgcgag 180  
cacgagagtt ggccctccgc tcccgcgact cccggcgccg gcggtctggc cgtgcgcacc 240  
ttcgtgtcgc acttcagggg ccgcgcggtg gccggccacc tgacgcgggc cgttgagccc 300  
ctgcgcacct tctcggtgct ggagcccggg ggacccggcg gctgcgcggc gagacgacgc 360  
gccaccgtgg aggagacggc gcgggcggcc gactgccgtg tcgccagaa cggcggcttc 420  
ttccgcatga actcgggcga gtgcctgggg aacgtggtga gcgacgagcg gcgggtgagc 480  
agctccgggg ggctgcagaa cgcgcagttc gggatccgcc gcgacgggac cctggtcacc 540  
gggtacctgt ctgaggagga ggtgctggac actgagaacc catttgatga gctgctgagt 600  
ggggtcgtgt ggctgattcg taatggaagc atctacatca acgagagcca agccacagag 660  
tgtgacgaga cacaggagac aggttccttt agcaaatttg tgaatgtgat atcagccagg 720  
acggccattg gccacgaccg gaaagggcag ctggtgctct ttcattgcaga cggccatacg 780  
gagcagcgtg gcatcaacct gtgggaaatg gcggagtcc tgcgtgaaaca ggacgtggtc 840  
aacgccatca acctggatgg gggaggctct gccacctttg tgctcaacgg gaccttggcc 900  
agttaccctg cagatcactg ccaggacaac atgtggcgct gtccccgcca agtgtccacc 960  
gtggtgtgtg tgcacgaacc ccgctgccag ccgctgact gccacggcca cgggacctgc 1020  
gtggacgggc actgccaatg caccgggcac ttctggcggg gtcccggtg tgatgagctg 1080





Phe Leu Leu Lys Gln Asp Val Val Asn Ala Ile Asn Leu Asp Gly Gly  
275 280 285

Gly Ser Ala Thr Phe Val Leu Asn Gly Thr Leu Ala Ser Tyr Pro Ser  
290 295 300

Asp His Cys Gln Asp Asn Met Trp Arg Cys Pro Arg Gln Val Ser Thr  
305 310 315 320

Val Val Cys Val His Glu Pro Arg Cys Gln Pro Pro Asp Cys His Gly  
325 330 335

His Gly Thr Cys Val Asp Gly His Cys Gln Cys Thr Gly His Phe Trp  
340 345 350

Arg Gly Pro Gly Cys Asp Glu Leu Asp Cys Gly Pro Ser Asn Cys Ser  
355 360 365

Gln His Gly Leu Cys Thr Glu Thr Gly Cys Arg Cys Asp Ala Gly Trp  
370 375 380

Thr Gly Ser Asn Cys Ser Glu Glu Cys Pro Leu Gly Trp His Gly Pro  
385 390 395 400

Gly Cys Gln Arg Arg Cys Lys Cys Glu His His Cys Pro Cys Asp Pro  
405 410 415

Lys Thr Gly Asn Cys Ser Val Ser Arg Val Lys Gln Cys Leu Gln Pro  
420 425 430

Pro Glu Ala Thr Leu Arg Ala Gly Glu Leu Ser Phe Phe Thr Arg Thr  
435 440 445

Ala Trp Leu Ala Leu Thr Leu Ala Leu Ala Phe Leu Leu Leu Ile Ser  
450 455 460

Ile Ala Ala Asn Leu Ser Leu Leu Leu Ser Arg Ala Glu Arg Asn Arg  
465 470 475 480

Arg Leu His Gly Asp Tyr Ala Tyr His Pro Leu Gln Glu Met Asn Gly  
485 490 495





actgggggtca acgtgtcctt gttcctgggc tccagggccg agaggaaccg gcacctcgac 1380  
 ggggactatg tgtatcaccc actgcaggag gtgaacgggg aagcgctgac tgcagagaag 1440  
 gagcacatgg aggaaactag caacccttc aaggactgaa gagctgcccc aacggcatgc 1500  
 tccagataat cttgtccctg ctctcactt ccacagggga cattgtgagg cactggcat 1560  
 ggatgctatg caccacccc ttgtctggcc atattcctcc tgtcccatg ctgtggctca 1620  
 tgccaaccta gcaataagga gctctggaga gctgcacct gcctcccgct cgcctatata 1680  
 tgctgcccag aggctgtct cgcacagggg tctcgccact gccaaagact cccaggaagt 1740  
 caaagactcc cagtaatcca ctagcaaatg gaactctgta acgcatcat aacaagagt 1800  
 gccactctcc gcgtgcacag gtatgaaata taaatcctta cacacacaca cacacacacc 1860  
 ctgggctcag ccacggcact cgccttttat acagcgctcat cgctggacag ccaactagaa 1920  
 ctctgcatcc tgtcacagga agcacctcat aagaaggaat ggggagggaa ggcagtcgcc 1980  
 ttgttttcag accttagccg aattc 2005

<210> 20  
 <211> 492  
 <212> PRT  
 <213> Mus musculus  
 <400> 20

Val Ser Arg Asp Asp Asp Leu Leu Leu Pro Tyr Pro Leu Ala Arg Arg  
 1 5 10 15

Arg Pro Ser Arg Asp Cys Ala Arg Val Arg Ser Gly Ser Pro Glu Gln  
 20 25 30

Glu Ser Trp Pro Pro Pro Pro Leu Ala Thr His Glu Pro Arg Ala Pro  
 35 40 45

Ser His His Ala Ala Val Arg Thr Phe Val Ser His Phe Glu Gly Arg  
 50 55 60

Ala Val Ala Gly His Leu Thr Arg Val Ala Asp Pro Leu Arg Thr Phe  
 65 70 75 80

Ser Val Leu Glu Pro Gly Gly Ala Gly Gly Cys Gly Gly Arg Ser Ala  
 85 90 95





gaggaaaact agtttcttct ggtcaagagg aggaaagagt ggagacctgt cattctaaga	300
tacccaaaac agggccaggt tggggacctg tgcctttaat cccatcactt ggggattagg	360
tagaagcaag aggctctaga ccagtctaca cactgaatth caagccagcc tacctataaa	420
tcagagaccc tgcttcaaaa ataaaattaa acaaaaacga agataaacca agctacccaa	480
aacacaagag ttaatccagt cagacaggtc tagcaaatgc taggatgaaa ggtgtgcacc	540
accacgagtg ggctgcaagc ctctctctct ctctctctct ctctctctct ctcgtttggt	600
ttgtttttcg agacaagggt tctctgtgta gccctggctg tcttggaact cactctgtag	660
accaggctgg cctcgagctt cactcttaaa agttcctctt cctcctcctc catcttttcc	720
tctctttacc ccctaggctc cttttcctct tcttgtcttt cagataaagt ctcaagtagt	780
ccagactggg ctcaaaactaa ctaactagcc aagaatagcc aacctcttaa cttccgattc	840
tcttgctct gctgaatgct ggggttggtg cgtggggccac cacttctggg ttgtgcaaca	900
cagaaggaac tagggcttta agcacgagaa gcaagttctg tacagactta cacaggccca	960
gcatctgttc ttgcaatttt ctgtaagttt gacataatat gagaataaaa agctatctat	1020
ctcccttcca gccttaccct ctctgatgga attcgaatgc gtaatcaaag caccacaacag	1080
cctggcctga aatcacgtgg ggcaagccca cgtgaccgga gcaccaatcc aatatggcgg	1140
cgcccagggg gcccgggctg ttcctcatal ccgcgctgct cggcttactc ggggtggcgt	1200
ggtgcagctt aagcttcggg tgagtgcaag ccgccggggc cagcctggct ggggtccacc	1260
tttctgagc gctctcaggc acagccctcc gacctcacga tgcctccgct cctgcagggt	1320
ttcccgcgac gatgacctgc tgctgcctta ccactagcg cgcagacgct cctcgcgaga	1380
ctgcgcccgg gtgcgctcag gtagcccaga gcaggagagc tggcctccgc cacctctggc	1440
caccacgaa ccccgggcgc caagccacca cgcggccgtg cgcaccttog tgtcgcaact	1500
cgagggggcg gcgggtggcg gccacctgac gggggctgcc gatccctac gcactttctc	1560
ggtgctggag ccgggaggag ccgggggctg cggcggcaga agcgccgcgg ctactgtgga	1620
ggacacagcc gtccggggcg gttgcgcgat cgctcagaac ggtggcttct tccgcatgag	1680
cactggcgag tgcttgggga acgtggtgag cgacggggcg ctggtgagca gctcaggggg	1740
actgcagaac gcgcagttcg gtatccgacg cgatggaacc atagtcaccg ggtgaggagg	1800
cagggagccc cggggctgta gagggcaaag ggtctctgat gttctttcag agccatgcct	1860
ccgagtccag gtccctaacc aaacttcctg tctttcttct tccgagtaat gacgctgaca	1920
ccttcttcc ttttaagttta ttcatgtgcc actgaataat ctgtgatcag gccgtgtgtg	1980









cttatagggg	gctagaagtc	aaaccagg	ccctatgtat	atgcagcaag	cactctagaa	7140
actggaacac	agccctgttt	gcagcccgg	taccttggag	ggttgggtcc	cagggatctg	7200
agggcatctc	cttcagcatg	gccatgtgca	caccaggag	ccaggctgtc	tgtgacagga	7260
gaccatgcc	ccaaggtga	gacctccctg	ccaccatctc	ctctccacag	agtgtcctct	7320
gggctggat	gggccagggt	gccagaggcc	ctgccagtgt	gagcaccagt	gtttctgtga	7380
cccgcagact	ggcaactgca	gcatctccca	aggatgcgg	ccttaaagg	tcttgagctg	7440
ggagcccttg	gggcagggtct	ggggtagggtg	gactctcccc	agcccttctt	tctgggtgtct	7500
tgcagtgagg	cagtgtctcc	agccaactga	ggctacgccg	agggcaggag	agctggcctc	7560
tttcaccagg	taagtgtttt	agcaggcact	gagcccctat	gtctcatccg	tgaggcacta	7620
gccaggccag	gaggtcacag	gttaccctct	actttgcaag	ctcagggaca	gtcacaggta	7680
aaactggcat	ccaggaaaga	ccctgagcta	cccagtggaa	ctcaaaggta	gcaggctatg	7740
gggtgcatgc	ctctggctgc	agagactcca	cttagatgct	ggagcagggc	catagagaca	7800
ggaaggactc	accttatttc	tgaactcttc	cgtgtgttca	ggctttgtgt	tgttggtgct	7860
tcctttctgc	tgtttcctgg	gtttcagct	ccatccccac	agggctcatg	gaaagaattg	7920
tgaagcaggg	gggtgggtc	aattggcaga	ttgattgcct	ggcatgcaga	aagccctagg	7980
ttcaatcccc	agcatttcat	atcataacc	aggcatgggtg	gcatcatgtg	cctgtaagtc	8040
cagcacttgg	gaggtagaag	cagaaaagcc	acgagttaa	gaatgttagg	gagtcttagg	8100
ccaacctggg	atacctaaga	caagagatag	atgtagggag	atagattgac	agacagacag	8160
acagacagac	agacagacag	atcttgagct	ggaccttctg	gcacaagcct	gtcatcctag	8220
ctattccagg	aagctgaagc	aggaagatag	caaattcaag	gccagcttaa	gccacagatt	8280
gagttcaaga	tcaacctgag	caactttatg	aaatcctatt	ataacataaa	aagttaggggt	8340
gggagggttag	gctgtagctc	agtggttagag	tgattgccta	gcacgcacaa	gacccagggt	8400
caattcccag	tactgcaaaa	aatatattag	gaacccccta	aaagcagtaa	cattcacatt	8460
agatgtgtgt	gtgtgtgtgt	gtgtgtgtgt	gtgtgtgtgt	gtgtgtgtgt	gtgtgttttg	8520
ttgggtat	atttcattta	catttccaat	gctatcccaa	aagtccccca	catcctcccc	8580
cacccaccac	cttggttttt	tttttttttt	tttttttttt	tttgacctga	aactcacagg	8640
ttagggttaga	caagctgact	ggtgagctcc	aacttccaac	gtaccatcat	gcctggcttt	8700
tgttttggtg	tctctgtgta	accctggatg	tcctggagct	ctctctgtag	accagcctgg	8760
ccttaaactc	acagaaaccc	acctgtttct	gcctcccatg	tgctgggatt	aaaggcgtgt	8820

```

gccacctcac ccagccctgc tggacttaaa ttgggtcttc attttataag acaagcatga 8880
gctaattccc cagttcctaa aatgttttta acatccttaa acatcagaga ctgtctgtgg 8940
tattccctcc atgtgtcttc agtataccta ctcccctccc tgcctaactgg gttcaacatg 9000
cccagtttgg gttctggctg cctgccccca ctcaagactc tcttttccat ctcaggacca 9060
cctggctagc cctcaccctg acactaattt tcctgctgct gatcagcact ggggtcaacg 9120
tgtccttggt cctgggctcc agggccgaga ggaaccggca cctcgacggg gactatgtgt 9180
atcaccctact gcaggaggtg aacggggaag cgctgactgc agagaaggag cacatggagg 9240
aaactagcaa ccccttcaag gactgaagag ctgccccaac ggcattgtcc agataatctt 9300
gtccctgctc ctcaactcca caggggacat tgtgaggcca ctggcatgga tgctatgcac 9360
cccacccttt gctggccata ttccctctgt ccccatgctg tggctcatgc caacctagca 9420
ataaggagct ctggagagcc tgcacctgcc tcccgtctgc ctatatctgc tgcccagagg 9480
cctgtctctc acaggggtct cgccactgcc aaagactccc aggaagtcaa agactcccag 9540
taatccacta gcaaattgaa ctctgtaacg ccatacataa aagagtggcc actctccgcg 9600
tgcacaggta tgaaatataa atccttacac acacacacac acacaccctc ggctcagcca 9660
cggcactctc cttttataca gcgtcatctc tggacagcca actagaactc tgcattctgt 9720
cacaggaagc acctcataag aaggaatggg gaggggaaggc agtcgccttg ttttcagacc 9780
ttagccgaat tc 9792

```

```

<210> 22
<211> 4
<212> PRT
<213> Artificial Sequence

```

```

<220>
<223> synthetic peptide

```

```

<400> 22
Ile Glu Gly Arg
1

```

```

<210> 23
<211> 5
<212> PRT
<213> Artificial Sequence

```

```

<220>
<223> synthetic peptide

```

<400> 23

Asp Asp Asp Asp Lys  
1 5

<210> 24

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> synthetic peptide

<400> 24

Arg Ala Arg Tyr Lys Arg  
1 5

<210> 25

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> synthetic peptide

<400> 25

Pro Gly Ala Ala His Tyr  
1 5

<210> 26

<211> 46

<212> PRT

<213> Homo sapiens

<400> 26

Asp Glu Glu Glu Ser Leu Lys Thr Gln Leu Ala Tyr Phe Thr Asp Ser  
1 5 10 15

Lys Asn Thr Gly Arg Gln Leu Lys Asp Thr Phe Ala Asp Ser Leu Arg  
20 25 30

Tyr Val Asn Lys Ile Leu Asn Ser Lys Phe Gly Phe Thr Ser  
35 40 45

<210> 27

<211> 112

<212> DNA



<213> hybrid

<400> 32  
gacgaagaag agtcattgaa gacacaattg gcctacttgg ccttaattaa cgtctctgca 60  
gattccctca gatatgtaaa taaaattc 88

<210> 33  
<211> 25  
<212> PRT  
<213> hybrid

<400> 33  
Thr Gln Leu Ala Tyr Phe Thr Asp Ser Lys Asn Thr Gly Ile Glu Gly  
1 5 10 15

Arg Asp Thr Phe Ala Asp Ser Leu Arg  
20 25

<210> 34  
<211> 75  
<212> DNA  
<213> hybrid

<400> 34  
acacaattgg cctacttcac tgatagcaag aatactggga tcgagggaag agatacattt 60  
gcagattccc tcaga 75

<210> 35  
<211> 25  
<212> PRT  
<213> hybrid

<400> 35  
Thr Gln Leu Ala Tyr Phe Thr Asp Ser Lys Asn Arg Ala Arg Tyr Lys  
1 5 10 15

Arg Asp Thr Phe Ala Asp Ser Leu Arg  
20 25

<210> 36  
<211> 75  
<212> DNA  
<213> hybrid

<400> 36  
acacaattgg cctacttcac tgatagcaag aatagagcca gatacaagag agatacattt 60

gcagattccc tcaga

75

<210> 37  
<211> 25  
<212> PRT  
<213> hybrid

<400> 37

Thr Gln Leu Ala Tyr Phe Thr Asp Ser Lys Asn Thr Asp Asp Asp Asp  
1 5 10 15

Lys Asp Thr Phe Ala Asp Ser Leu Arg  
20 25

<210> 38  
<211> 25  
<212> PRT  
<213> hybrid

<400> 38

Thr Gln Leu Ala Tyr Phe Thr Asp Ser Lys Asn Pro Gly Ala Ala His  
1 5 10 15

Tyr Asp Thr Phe Ala Asp Ser Leu Arg  
20 25